#15

SEQUENCE LISTING

<110> Blatt, Michael

Leyman, Barbara

<120> Protein Involved in Abscisic Acid Signalling

<130> 2186PB-1

<140> 09/509,738

<141> 2000-03-30

<160> 44

<170> PatentIn version 3.0

<210> 1

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<212> DNA

<213> Nicotiana tabacum

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<222> (18)..(917)

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ttc aga gct gac gat caa tcg gac tct cac gcc ata gaa atg gga gac       98
Phe Arg Ala Asp Asp Gln Ser Asp Ser His Ala Ile Glu Met Gly Asp
            15                  20                  25

att act ggc gga gtc aat ctc gac aaa ttc ttc gaa gat gtt gaa gcc      146
Ile Thr Gly Gly Val Asn Leu Asp Lys Phe Phe Glu Asp Val Glu Ala
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att aaa gac gaa ctc aaa ggc ctc gag aaa atc tat tcc caa ctc caa      194
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 45                  50                  55

tct tcc cat gaa aaa agc aag act ctt cac aac gct aaa gcc gtt aaa      242
Ser Ser His Glu Lys Ser Lys Thr Leu His Asn Ala Lys Ala Val Lys
60                  65                  70                  75

gat cta aga tcc aac atg gat aat gac gtt tcc atg gca ttg aag aaa      290
Asp Leu Arg Ser Asn Met Asp Asn Asp Val Ser Met Ala Leu Lys Lys
                80                  85                  90

gcc aaa ttc atc aaa gtt cgt ctc gaa gcc tta gac aga tca aat gca      338
Ala Lys Phe Ile Lys Val Arg Leu Glu Ala Leu Asp Arg Ser Asn Ala
            95                  100                 105

gcg aat cga agc ctc cct gga tgt gga ccc gga agt tca tct gac agg      386
Ala Asn Arg Ser Leu Pro Gly Cys Gly Pro Gly Ser Ser Ser Asp Arg
        110                 115                 120

acg aga act tca gtt gtg aac gga tta agg aag aaa ctt caa gag tca      434
Thr Arg Thr Ser Val Val Asn Gly Leu Arg Lys Lys Leu Gln Glu Ser
    125                 130                 135

atg aat cag ttc aac gag cta agg caa aag atg gca tct gaa tat agg      482
Met Asn Gln Phe Asn Glu Leu Arg Gln Lys Met Ala Ser Glu Tyr Arg
140                 145                 150                 155

gaa aca gtt caa cga cga tat tat acc gtc aca gga gaa aat cct gat      530
Glu Thr Val Gln Arg Arg Tyr Tyr Thr Val Thr Gly Glu Asn Pro Asp
                160                 165                 170

gaa gca gtt ctt gat aca ctc ata tct aca ggt caa agt gag acg ttc      578
Glu Ala Val Leu Asp Thr Leu Ile Ser Thr Gly Gln Ser Glu Thr Phe
            175                 180                 185

ttg caa aag gca att caa gag caa ggg aga gga caa gtg atg gat aca      626
Leu Gln Lys Ala Ile Gln Glu Gln Gly Arg Gly Gln Val Met Asp Thr
        190                 195                 200

gtt atg gaa att caa gaa agg cat gaa gct gtg aag gaa ttg gag agg      674
Val Met Glu Ile Gln Glu Arg His Glu Ala Val Lys Glu Leu Glu Arg
    205                 210                 215

aat ttg aaa gaa ttg cat caa gta ttc ttg gac atg gct gtt ttg gtt      722
Asn Leu Lys Glu Leu His Gln Val Phe Leu Asp Met Ala Val Leu Val
220                 225                 230                 235

gaa agt caa gga gct caa ctt gat gat att gag agc caa gtg aat agg      770
Glu Ser Gln Gly Ala Gln Leu Asp Asp Ile Glu Ser Gln Val Asn Arg
                240                 245                 250

gct aat tcc ttc gtt aga ggg ggt gct cag caa ctg caa gtg gca agg      818
Ala Asn Ser Phe Val Arg Gly Gly Ala Gln Gln Leu Gln Val Ala Arg
            255                 260                 265

aag cac cag aag aac act aga aaa tgg act tgt ttt gct att att ctt      866
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Lys His Gln Lys Asn Thr Arg Lys Trp Thr Cys Phe Ala Ile Ile Leu
        270                 275                 280

ctg ctt atc atc att ttg gtg gtg gtt ctt tct att cag cca tgg aaa      914
Leu Leu Ile Ile Ile Leu Val Val Val Leu Ser Ile Gln Pro Trp Lys
    285                 290                 295

aaa tgagaatttg tctatggtca aaggtcttct ggtggacccc ttcaatgttt          967
Lys
300

tgaatattct aaatttttat attttattat tttagccatg cttattattt tgtgttattt   1027

tggatttttt ttttgttttt aatgtgggga agagtaaact ggatgggggt ccatgtgcta   1087

tttagagaaa tacttgggag ttctcttttt gtaattattg ctgtatttag agtataattc   1147

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<213> Nicotiana tabacum

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Asn Leu Asp Lys Phe Phe Glu Asp Val Glu Ala Ile Lys Asp Glu Leu
        35                  40                  45

Lys Gly Leu Glu Lys Ile Tyr Ser Gln Leu Gln Ser Ser His Glu Lys
    50                  55                  60

Ser Lys Thr Leu His Asn Ala Lys Ala Val Lys Asp Leu Arg Ser Asn
65                  70                  75                  80

Met Asp Asn Asp Val Ser Met Ala Leu Lys Lys Ala Lys Phe Ile Lys
                85                  90                  95

Val Arg Leu Glu Ala Leu Asp Arg Ser Asn Ala Ala Asn Arg Ser Leu
            100                 105                 110
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Pro Gly Cys Gly Pro Gly Ser Ser Ser Asp Arg Thr Arg Thr Ser Val
        115                 120                 125

Val Asn Gly Leu Arg Lys Lys Leu Gln Glu Ser Met Asn Gln Phe Asn
    130                 135                 140

Glu Leu Arg Gln Lys Met Ala Ser Glu Tyr Arg Glu Thr Val Gln Arg
145                 150                 155                 160

Arg Tyr Tyr Thr Val Thr Gly Glu Asn Pro Asp Glu Ala Val Leu Asp
                165                 170                 175

Thr Leu Ile Ser Thr Gly Gln Ser Glu Thr Phe Leu Gln Lys Ala Ile
            180                 185                 190

Gln Glu Gln Gly Arg Gly Gln Val Met Asp Thr Val Met Glu Ile Gln
        195                 200                 205

Glu Arg His Glu Ala Val Lys Glu Leu Glu Arg Asn Leu Lys Glu Leu
    210                 215                 220

His Gln Val Phe Leu Asp Met Ala Val Leu Val Glu Ser Gln Gly Ala
225                 230                 235                 240

Gln Leu Asp Asp Ile Glu Ser Gln Val Asn Arg Ala Asn Ser Phe Val
                245                 250                 255

Arg Gly Gly Ala Gln Gln Leu Gln Val Ala Arg Lys His Gln Lys Asn
            260                 265                 270

Thr Arg Lys Trp Thr Cys Phe Ala Ile Ile Leu Leu Leu Ile Ile Ile
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<222> (77)..(991)

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                  Met Asn Asp Leu Phe Ser Ser Ser Phe Ser Arg Phe
                  1               5                  10

cgc agc gga gaa cca tcc cct cgc cga gac gtt gcc ggc ggt ggc gac      160
Arg Ser Gly Glu Pro Ser Pro Arg Arg Asp Val Ala Gly Gly Gly Asp
        15                  20                  25

gga gtt cag atg gcg aat ccc gcg gga tca acc ggt ggt gtg aac ctc      208
Gly Val Gln Met Ala Asn Pro Ala Gly Ser Thr Gly Gly Val Asn Leu
    30                  35                  40

gac aag ttc ttc gaa gat gtt gaa tct gtg aaa gaa gag cta aag gag      256
Asp Lys Phe Phe Glu Asp Val Glu Ser Val Lys Glu Glu Leu Lys Glu
45                  50                  55                  60

cta gat cgg ctc aac gaa aca ctc tct tca tgt cac gag cag agc aag      304
Leu Asp Arg Leu Asn Glu Thr Leu Ser Ser Cys His Glu Gln Ser Lys
                65                  70                  75

acg ctt cac aat gct aaa gcc gtt aaa gat ctc cgg tct aaa atg gac      352
Thr Leu His Asn Ala Lys Ala Val Lys Asp Leu Arg Ser Lys Met Asp
            80                  85                  90

ggt gac gtt gga gtc gcg ttg aag aag gcg aag atg att aaa gtt aaa      400
Gly Asp Val Gly Val Ala Leu Lys Lys Ala Lys Met Ile Lys Val Lys
        95                  100                 105

ctc gag gcg cta gat cgt gcc aat gct gct aat cgg agt ctc cct ggc      448
Leu Glu Ala Leu Asp Arg Ala Asn Ala Ala Asn Arg Ser Leu Pro Gly
    110                 115                 120

tgt gga cct ggt tct tcc tcc gat cga acc agg acc tct gtc ctc aat      496
Cys Gly Pro Gly Ser Ser Ser Asp Arg Thr Arg Thr Ser Val Leu Asn
125                 130                 135                 140

ggt ctc agg aag aaa ttg atg gac tct atg gat agt ttc aac cga ttg      544
Gly Leu Arg Lys Lys Leu Met Asp Ser Met Asp Ser Phe Asn Arg Leu
                145                 150                 155

agg gag ctt atc tcg tcc gag tat aga gaa act gta cag agg agg tac      592
Arg Glu Leu Ile Ser Ser Glu Tyr Arg Glu Thr Val Gln Arg Arg Tyr
            160                 165                 170

ttc acc gtc acc ggc gag aat ccg gat gaa cga acc cta gat cga ctg      640
Phe Thr Val Thr Gly Glu Asn Pro Asp Glu Arg Thr Leu Asp Arg Leu
        175                 180                 185

att tcc act gga gag agt gag aga ttc ttg cag aaa gca ata caa gaa      688
Ile Ser Thr Gly Glu Ser Glu Arg Phe Leu Gln Lys Ala Ile Gln Glu
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    190                 195                 200

caa gga aga gga agg gtg tta gac acc att aac gag att caa gaa agg      736
Gln Gly Arg Gly Arg Val Leu Asp Thr Ile Asn Glu Ile Gln Glu Arg
205                 210                 215                 220

cat gat cgc gtt aaa gac att gag aag aat ctc agg gag ctt cac cag      784
His Asp Arg Val Lys Asp Ile Glu Lys Asn Leu Arg Glu Leu His Gln
                225                 230                 235

gtg ttt cta gac atg gcc gtg ctg gta gag cac cag gga gct cag ctt      832
Val Phe Leu Asp Met Ala Val Leu Val Glu His Gln Gly Ala Gln Leu
            240                 245                 250

gat gac atc gag agt cat gtg ggt cga gct agc tcc ttt atc aga ggc      880
Asp Asp Ile Glu Ser His Val Gly Arg Ala Ser Ser Phe Ile Arg Gly
        255                 260                 265

gga act gac cag cta caa acc gct cgg gtt tac cag aag aac acg cga      928
Gly Thr Asp Gln Leu Gln Thr Ala Arg Val Tyr Gln Lys Asn Thr Arg
    270                 275                 280

aaa tgg aca tgt att gcc att att att ctc atc atc atc ata act gtt      976
Lys Trp Thr Cys Ile Ala Ile Ile Ile Leu Ile Ile Ile Ile Thr Val
285                 290                 295                 300

gtg gtt ctt gct gtt ttaaaaccgt ggaacaacag cagtggcggc ggcggcggtg     1031
Val Val Leu Ala Val
                305

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ctcaggcaag gcgtctattg cgttgaagtt gaagttgaag ttgagtttcg ttatttgcat   1151

atatattctt tctttgaaaa accttattat caaaccagct ttgtgttact actttctact   1211

gctggtttgt tgttaatctc ccgtttattt ggtttttgtg aaagaattta aaatgtgggt   1271

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Met Asn Asp Leu Phe Ser Ser Ser Phe Ser Arg Phe Arg Ser Gly Glu
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Pro Ser Pro Arg Arg Asp Val Ala Gly Gly Gly Asp Gly Val Gln Met
            20                  25                  30

Ala Asn Pro Ala Gly Ser Thr Gly Gly Val Asn Leu Asp Lys Phe Phe
        35                  40                  45

Glu Asp Val Glu Ser Val Lys Glu Glu Leu Lys Glu Leu Asp Arg Leu
    50                  55                  60

Asn Glu Thr Leu Ser Ser Cys His Glu Gln Ser Lys Thr Leu His Asn
65                  70                  75                  80

Ala Lys Ala Val Lys Asp Leu Arg Ser Lys Met Asp Gly Asp Val Gly
                85                  90                  95

Val Ala Leu Lys Lys Ala Lys Met Ile Lys Val Lys Leu Glu Ala Leu
            100                 105                 110

Asp Arg Ala Asn Ala Ala Asn Arg Ser Leu Pro Gly Cys Gly Pro Gly
        115                 120                 125

Ser Ser Ser Asp Arg Thr Arg Thr Ser Val Leu Asn Gly Leu Arg Lys
    130                 135                 140

Lys Leu Met Asp Ser Met Asp Ser Phe Asn Arg Leu Arg Glu Leu Ile
145                 150                 155                 160

Ser Ser Glu Tyr Arg Glu Thr Val Gln Arg Arg Tyr Phe Thr Val Thr
                165                 170                 175

Gly Glu Asn Pro Asp Glu Arg Thr Leu Asp Arg Leu Ile Ser Thr Gly
            180                 185                 190

Glu Ser Glu Arg Phe Leu Gln Lys Ala Ile Gln Glu Gln Gly Arg Gly
        195                 200                 205

Arg Val Leu Asp Thr Ile Asn Glu Ile Gln Glu Arg His Asp Arg Val
    210                 215                 220

Lys Asp Ile Glu Lys Asn Leu Arg Glu Leu His Gln Val Phe Leu Asp
225                 230                 235                 240

Met Ala Val Leu Val Glu His Gln Gly Ala Gln Leu Asp Asp Ile Glu
                245                 250                 255
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Ser His Val Gly Arg Ala Ser Ser Phe Ile Arg Gly Gly Thr Asp Gln
260 265 270

Leu Gln Thr Ala Arg Val Tyr Gln Lys Asn Thr Arg Lys Trp Thr Cys
275 280 285

Ile Ala Ile Ile Ile Leu Ile Ile Ile Ile Thr Val Val Val Leu Ala
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Val
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<213> Nicotiana tabacum

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tattgtgttt tattattcgt accgatttta ttattttata tttttaaatc ttataagttt 240

tgtaacttcc ccaggtggtc ttctggaaac tggtatctgt ttaagagtaa aaaaggtacc 300

gacttatctt tcttggtggt ggttttacta ctattcgtct tcttattatc gttttgttca 360

ggtaaaagat cacaagaaga ccacgaagga acggtgaacg tcaacgactc gtgggggaga 420

ttgcttcctt aatcgggata agtgaaccga gagttatagt agttcaactc gaggaactga 480

aagttggttt tgtcggtaca ggttcttatg aactacgtta agaaagttta aggagaggtt 540

aaggaagtgt cgaagtacgg aaagaactta aaggtattga cataggtagt gaacaggaga 600

gggaacgaga acttaacgga aaacgttctt gcagagtgaa actggacatc tatactcaca 660

tagttcttga cgaagtagtc ctaaaagagg acactgccat attatagcag caacttgaca 720

aagggatata agtctacggt agaaaacgga atcgagcaac ttgactaagt aactgagaac 780

ttcaaagaag gaattaggca agtgttgact tcaagagcag gacagtctac ttgaaggccc 840

aggtgtaggt ccctccgaag ctaagcgacg taaactagac agattccgaa gctctgcttg 900

aaactactta aaccgaaaga agttacggta cctttgcagt aataggtaca acctagaatc 960

tagaaattgc cgaaatcgca acacttctca gaacgaaaaa agtacccttc taacctcaac 1020

ccttatctaa aagagctccg gaaactcaag cagaaattac cgaagttgta gaagcttctt 1080

aaacagctct aactgaggcg gtcattacag agggtaaaga taccgcactc tcaggctaac 1140

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20 25 30

Arg Leu Arg Ile Ile His Arg Asp Leu Lys Ala Ser Asn Ile Leu Leu
35 40 45

Asp Glu Gln Leu Asn Pro Lys Ile Ser Asp Phe Gly Met Ala Arg Ile
50 55 60

Phe Pro Gly Ser Gln Asp Gln Ala Asn Thr Glu Arg Val Val Gly Thr
65 70 75 80

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<213> Ipomoea trifida

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Ile Cys Gly Ile Ala Arg Gly Leu Leu Tyr Leu His Gln Asp Ser Arg
20 25 30

Phe Arg Ile Ile His Arg Asp Leu Lys Ala Ser Asn Ile Leu Leu Asp
35 40 45

Lys Glu Met Asn Pro Lys Ile Ser Asp Phe Gly Met Ala Arg Ile Phe
50 55 60

Gly Gly Asp Glu Thr Asp Ala Asn Asn Thr Lys Arg Val
65 70 75

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<213> brassica campestris

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Leu Asn Trp Lys Asp Arg Phe Ala Ile Thr Asn Gly Val Ala Arg Gly
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Leu Leu Tyr Leu His Gln Asp Ser Arg Phe Arg Ile Ile His Arg Asp
20 25 30

Leu Lys Pro Gly Asn Ile Leu Leu Asp Lys Tyr Met Ile Pro Lys Ile
35 40 45

Ser Asp Phe Gly Met Ala Arg Ile Phe Ala Arg Asp Glu Ile Gln Ala
50 55 60

Arg Thr Asp Asn Ala Val Gly Thr
65 70

<210> 9

<211> 72

<212> PRT

<213> Brassica oleracea

<400> 9

Lys Lys Arg Ser Ser Asn Leu Asn Trp Lys Asp Arg Phe Ala Ile Ile
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Asn Gly Val Ala Arg Gly Leu Leu Tyr Leu His Gln Asp Ser Arg Phe
20 25 30

Arg Ile Ile His Arg Asp Met Lys Pro Ser Asn Ile Leu Leu Asp Lys
35 40 45

Tyr Met Ile Pro Lys Ile Ser Asp Phe Gly Met Ala Arg Ile Phe Ala
50 55 60

Arg Asp Glu Thr Glu Ala Asn Thr
65 70

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<213> Nicotiana tabacum

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Val Val Leu Ser Met Leu Thr Ser Glu Ile Ser Asp Leu Pro Ser Pro
20 25 30

Lys Gln Pro Ala Phe Thr Thr Arg Pro Ser Cys Ser Glu Lys Glu Ser
35 40 45

Ser Lys Thr Gln Gly Ser Val Asn Thr Val Ser Ile Thr Ile Met Glu
50 55 60

Gly Arg
65

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<211> 70

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<213> Ipomoea trifida

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Gly Leu Leu Cys Val Gln Glu Gln Ala Glu Asp Arg Pro Asn Met Ala
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Thr Val Val Leu Met Leu Gly Ser Glu Ser Ala Thr Leu Pro Gln Pro
20 25 30

Lys His Pro Gly Phe Cys Leu Gly Ser Arg Pro Ala Asp Met Asp Ser
35 40 45

Ser Thr Ser Asn Cys Asp Glu Ser Cys Thr Val Asn Gln Val Thr Val
50 55 60

Thr Met Leu Asp Gly Arg
65 70

<210> 12

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<212> PRT

<213> brassica campestris

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Gly Leu Leu Cys Ile Gln Glu Arg Ala Glu His Arg Pro Thr Met Ser
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Ser Val Val Trp Met Leu Gly Ser Glu Ala Thr Glu Ile Pro Gln Pro
20 25 30

Lys Pro Pro Val Tyr Cys Leu Ile Ala Ser Tyr Tyr Ala Asn Asn Pro
35 40 45

Ser Ser Ser Arg Gln Phe Asp Asp Asp Glu Ser Trp Thr Val Asp Lys
50 55 60

Tyr Thr Trp Ser Val Ile Asp Ala Arg
65 70

<210> 13

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<213> Brassica oleracea

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Gly Leu Leu Cys Ile Gln Glu Arg Ala Glu Asp Arg Pro Thr Met Ser
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Ser Val Val Trp Met Leu Gly Ser Glu Ala Thr Asp Ile Pro Gln Pro
20 25 30

Lys Pro Pro Ile Tyr Cys Leu Ile Thr Ser Tyr Tyr Ala Asn Asn Pro
35 40 45

Ser Ser Ser Arg Gln Phe Glu Asp Asp Glu Ser Trp Thr Val Asn Lys
50 55 60

Tyr Thr Cys Ser Val Ile Asp Ala Arg
65 70

<210> 14

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<212> PRT

<213> Nicotiana tabacum

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Arg Phe Arg Ala Val Thr Ser Ala Tyr Tyr Arg Ser Ala Val Gly Ala
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Leu Leu Val Tyr Asp Ile Ser Arg Lys Thr Thr Phe Glu Asn Ile Gln
20 25 30

Cys Trp Leu Asp Glu Leu His Thr His Cys Asp Thr Thr Val Ala Arg
35 40 45

Met Leu Val Gly Asn Lys Cys Asp Leu Glu Asn Ile Arg Asp Val Ser
50 55 60

Ile Tyr Glu Gly Lys Asn Leu Ala Glu Glu Glu Gly Leu Phe Phe Ile
65 70 75 80

Glu Thr Ser Ala Leu Asp Ser Thr Asn Val Lys Gln Pro Leu Lys Leu
85 90 95

Ser Ser Ala Gln Ile Tyr Gln Asn Leu Ser Arg Lys Val Leu His Ser
100 105 110

Asp Ser Tyr Lys Thr Glu Leu Ser Val His Pro Val
115 120

<210> 15

<211> 124

<212> PRT

<213> Glycine max

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1 5 10 15

Leu Ile Val Tyr Asp Ile Ser Arg Arg Thr Thr Phe Asp Ser Val Gly
20 25 30

Arg Trp Leu Asp Glu Leu Lys Thr His Cys Asp Thr Thr Val Ala Met
35 40 45

Met Leu Val Gly Asn Lys Cys Asp Leu Glu Asn Ile Arg Ala Val Ser
50 55 60

Ile Asp Glu Gly Lys Ser Leu Ala Glu Ala Glu Gly Leu Phe Phe Met
65 70 75 80

Glu Thr Ser Ala Leu Asp Ser Thr Asn Val Lys Met Ala Phe Glu Met
85 90 95

Val Ile Arg Glu Ile Tyr Asn Asn Val Ser Arg Lys Val Leu Asn Ser
100 105 110

Glu Thr Tyr Lys Ala Glu Leu Ser Val Asn Arg Val
115 120

<210> 16

<211> 124

<212> PRT

<213> Lotus japonicus

<400> 16

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Leu Ile Val Tyr Asp Ile Thr Arg Arg Thr Thr Phe Asp Ser Val Ser
20 25 30

Arg Trp Leu Asp Glu Leu Lys Thr His Cys Asp Thr Thr Val Ala Met
35 40 45

Met Leu Val Gly Asn Lys Cys Asp Leu Glu Asn Ile Arg Ala Val Ser
50 55 60

Ile Glu Glu Gly Lys Ser Leu Ala Glu Ala Gln Gly Leu Phe Phe Met
65 70 75 80

Glu Thr Ser Ala Leu Asp Ser Thr Asn Val Arg Thr Ala Phe Glu Met
85 90 95

Val Ile Arg Glu Ile Tyr Asn Asn Val Ser Arg Lys Val Leu Asn Ser
100 105 110

Asp Thr Tyr Lys Ala Glu Leu Ser Val Asp Arg Val
115 120

<210> 17

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<212> PRT

<213> Arabidopsis thaliana

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1 5 10 15

Leu Val Val Tyr Asp Ile Thr Arg Arg Thr Thr Phe Glu Ser Val Gly
20 25 30

Arg Trp Leu Asp Glu Leu Lys Ile His Ser Asp Thr Thr Val Ala Arg
35 40 45

Met Leu Val Gly Asn Lys Cys Asp Leu Glu Asn Ile Arg Ala Val Ser
50 55 60

Val Glu Glu Gly Lys Ala Leu Ala Glu Glu Glu Gly Leu Phe Phe Val
65 70 75 80

Glu Thr Ser Ala Leu Asp Ser Thr Asn Val Lys Thr Ala Phe Glu Met
85 90 95

Val Ile Leu Asp Ile Tyr Asn Asn Val Ser Arg Lys Gln Leu Asn Ser
100 105 110

Asp Thr Tyr Lys Asp Glu Leu Thr Val Asn Arg Val
115 120

<210> 18

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<213> Arabidopsis thaliana

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Arg Phe Arg Ala Val Thr Ser Ala Tyr Tyr Arg Gly Ala Val Gly Ala
1 5 10 15

Leu Val Val Tyr Asp Ile Thr Arg Ser Ser Thr Phe Glu Asn Val Gly
20 25 30

Arg Trp Leu Asp Glu Leu Asn Thr His Ser Asp Thr Thr Val Ala Lys
35 40 45

Met Leu Ile Gly Asn Lys Cys Asp Leu Glu Ser Ile Arg Ala Val Ser
50 55 60

Val Glu Glu Gly Lys Ser Leu Ala Glu Ser Glu Gly Leu Phe Phe Met
65 70 75 80

Glu Thr Ser Ala Leu Asp Ser Thr Asn Val Lys Thr Ala Phe Glu Met
85 90 95

Val Ile Arg Glu Ile Tyr Ser Asn Ile Ser Arg Lys Gln Leu Asn Ser
100 105 110

Asp Ser Tyr Lys Glu Glu Leu Thr Val Asn Arg Val
115 120

<210> 19

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<212> PRT

<213> Nicotiana tabacum

<400> 19

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            20                  25                  30

Arg Trp Leu Asp Glu Leu Lys Thr His Ser Asp Thr Thr Val Ala Arg
        35                  40                  45

Met Leu Val Gly Asn Lys Cys Asp Leu Asp Asn Ile Arg Ala Val Ser
    50                  55                  60

Val Glu Glu Gly Lys Ser Leu Ala Glu Ser Glu Gly Met Phe Phe Met
65                  70                  75                  80

Glu Thr Ser Ala Leu Asp Ala Thr Asn Val Asn Lys Ala Phe Asp Met
                85                  90                  95

Val Ile Arg Glu Ile Tyr Asn Ser Val Ser Arg Lys Val Leu Asn Ser
            100                 105                 110

Asp Ser Tyr Lys Ala Glu Leu Ser Val Asn Arg Val
        115                 120
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<210> 20

<211> 168

<212> PRT

<213> Nicotiana tabacum

<400> 20

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Leu Ile Phe Ser Leu Glu Thr Phe Leu Leu Val Leu Leu Phe Phe Thr
1               5                  10                  15

Leu Val Ser Ser Ser Ala Ser Glu Ile Phe Phe Glu Glu Ser Phe Asp
            20                  25                  30

Asp Gly Trp Arg Ser Arg Trp Val Lys Ser Asp Trp Lys Ile Ser Glu
        35                  40                  45

Gly Lys Ala Gly Ser Phe Lys His Thr Ala Gly Thr Trp Ala Gly Asp
    50                  55                  60

Pro Asp Asp Lys Gly Ile His Thr Thr Asn Asp Ala Lys His Phe Ala
65                  70                  75                  80

Val Ser Ala Lys Ile Pro Glu Phe Ser Asn Lys Asn Arg Thr Leu Val
                85                  90                  95

Val Gln Tyr Ser Ile Lys Phe Glu Pro Asp Ile Glu Cys Gly Arg Gly
            100                 105                 110

Tyr Ile Lys Leu Leu Ser Gly Tyr Val His Pro Lys Lys Phe Gly Gly
        115                 120                 125
```

Asp Thr Pro Tyr Ser Phe Met Phe Gly Ala Asp Ile Cys Gly Ser Gln
130 135 140

Thr Lys Lys Pro Ser Cys Leu Tyr Phe Pro Tyr Pro Gly Ala Glu Leu
145 150 155 160

Pro Pro Leu Pro Glu Arg Asn Leu
165

<210> 21

<211> 165

<212> PRT

<213> Arabidopsis thaliana

<400> 21

Asn Lys Leu Ser Phe Phe Cys Phe Phe Phe Leu Val Ser Val Leu Thr
1 5 10 15

Leu Ala Pro Leu Ala Phe Ser Glu Ile Phe Leu Glu Glu His Phe Glu
20 25 30

Gly Gly Trp Lys Ser Arg Trp Val Leu Ser Asp Trp Lys Arg Asn Glu
35 40 45

Gly Lys Ala Gly Thr Phe Lys His Thr Ala Gly Lys Trp Pro Gly Asp
50 55 60

Pro Asp Asn Lys Gly Ile Gln Thr Tyr Asn Asp Ala Lys His Tyr Ala
65 70 75 80

Ile Ser Ala Lys Ile Pro Glu Phe Ser Asn Lys Asn Arg Thr Leu Val
85 90 95

Val Gln Tyr Ser Val Lys Ile Glu Gln Asp Ile Glu Cys Gly Gly Ala
100 105 110

Tyr Ile Lys Leu Leu Ser Gly Tyr Val Asn Gln Lys Gln Phe Gly Gly
115 120 125

Asp Thr Pro Tyr Ser Leu Met Phe Gly Pro Asp Ile Cys Gly Thr Gln
130 135 140

Thr Lys Lys Leu His Val Ile Val Ser Tyr Gln Gly Gln Asn Tyr Pro
145 150 155 160

Ile Lys Lys Asp Leu
165

<210> 22

<211> 82

<212> PRT

<213> Nicotiana tabacum

<400> 22

Gly Val Trp Met Glu Pro Asp Tyr Ala Lys Thr Ser Asp Ser Arg Lys
1 5 10 15

Cys Leu Pro Ile Gly Glu Ala Glu Lys Glu Ala Phe Glu Glu Ala Glu
20 25 30

Lys Val Arg Lys Ala Lys Glu Glu Glu Glu Ala Gln Arg Ala Arg Glu
35 40 45

Glu Gly Glu Arg Arg Lys Arg Glu Arg Gly Arg Asp Arg His Arg Asp
50 55 60

Arg Tyr Lys Lys Arg Tyr His His Asp Tyr Met Asp Asp Tyr His Asp
65 70 75 80

Glu Leu

<210> 23

<211> 85

<212> PRT

<213> Arabidopsis thaliana

<400> 23

Ile Leu Ile Cys Asp Asp Pro Ala Tyr Ala Arg Ser Ile Val Asp Asp
1 5 10 15

Tyr Phe Ala Gln His Arg Glu Ser Glu Lys Glu Leu Phe Ala Glu Ala
20 25 30

Glu Lys Glu Arg Lys Ala Arg Glu Asp Glu Glu Ala Arg Ile Ala Arg
35 40 45

Glu Glu Gly Glu Arg Arg Arg Lys Glu Arg Asp His Arg Tyr Gly Asp
50 55 60

Arg Arg Arg Arg Tyr Lys Arg Pro Asn Pro Arg Asp Tyr Met Asp Asp
65 70 75 80

Tyr His Asp Glu Leu
85

<210> 24

<211> 310

<212> PRT

<213> Arabidopsis thaliana

<400> 24

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Met Asn Asp Leu Met Thr Lys Ser Phe Met Ser Tyr Val Asp Leu Lys
1               5                  10                  15

Lys Ala Ala Met Lys Asp Met Glu Ala Gly Pro Asp Phe Asp Leu Glu
            20                  25                  30

Met Ala Ser Thr Lys Ala Asp Lys Met Asp Glu Asn Leu Ser Ser Phe
        35                  40                  45

Leu Glu Glu Ala Glu Tyr Val Lys Ala Glu Met Gly Leu Ile Ser Glu
    50                  55                  60

Thr Leu Ala Arg Ile Glu Gln Tyr His Glu Glu Ser Lys Gly Val His
65                  70                  75                  80

Lys Ala Glu Ser Val Lys Ser Leu Arg Asn Lys Ile Ser Asn Glu Ile
                85                  90                  95

Val Ser Gly Leu Arg Lys Ala Lys Ser Ile Lys Ser Lys Leu Glu Glu
            100                 105                 110

Met Asp Lys Ala Asn Lys Glu Ile Lys Arg Leu Ser Gly Thr Pro Val
        115                 120                 125

Tyr Arg Ser Arg Thr Ala Val Thr Asn Gly Leu Arg Lys Lys Leu Lys
    130                 135                 140

Glu Val Met Met Glu Phe Gln Gly Leu Arg Gln Lys Met Met Ser Glu
145                 150                 155                 160

Tyr Lys Glu Thr Val Glu Arg Arg Tyr Phe Thr Val Thr Gly Glu His
                165                 170                 175

Ala Asn Asp Glu Met Ile Glu Lys Ile Ile Thr Asp Asn Ala Gly Gly
            180                 185                 190

Glu Glu Phe Leu Thr Arg Ala Ile Gln Glu His Gly Lys Gly Lys Val
        195                 200                 205

Leu Glu Thr Val Val Glu Ile Gln Asp Arg Tyr Asp Ala Ala Lys Glu
    210                 215                 220

Ile Glu Lys Ser Leu Leu Glu Leu His Gln Val Phe Leu Asp Met Ala
225                 230                 235                 240

Val Met Val Glu Ser Gln Gly Glu Gln Met Asp Glu Ile Glu His His
                245                 250                 255

Val Ile Asn Ala Ser His Tyr Val Ala Asp Gly Ala Asn Glu Leu Lys
            260                 265                 270

Thr Ala Lys Ser His Gln Arg Asn Ser Arg Lys Trp Met Cys Ile Gly
        275                 280                 285
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Ile Ile Val Leu Leu Leu Ile Ile Leu Ile Val Val Ile Pro Ile Ile
290 295 300

Thr Ser Phe Ser Ser Ser
305 310

<210> 25

<211> 259

<212> PRT

<213> Homo sapiens

<400> 25

Met Asp Glu Phe Phe Glu Gln Val Glu Glu Ile Arg Gly Phe Ile Asp
1 5 10 15

Lys Ile Ala Glu Asn Val Glu Glu Val Lys Arg Lys His Ser Ala Ile
20 25 30

Leu Ala Ser Pro Asn Pro Asp Glu Lys Thr Lys Val Glu Leu Glu Glu
35 40 45

Leu Met Ser Asp Ile Lys Lys Thr Ala Asn Lys Val Arg Ser Lys Leu
50 55 60

Lys Ser Ile Glu Gln Ser Ile Glu Gln Glu Glu Gly Leu Asn Arg Ser
65 70 75 80

Ser Ala Asp Leu Arg Ile Arg Lys Thr Gln His Ser Thr Leu Ser Arg
85 90 95

Lys Phe Val Glu Val Met Ser Glu Tyr Asn Ala Thr Gln Ser Val Tyr
100 105 110

Arg Glu Arg Cys Lys Gly Arg Ile Gln Arg Gln Leu Glu Ile Thr Gly
115 120 125

Arg Thr Thr Thr Ser Glu Glu Leu Glu Asp Met Leu Glu Ser Gly Asn
130 135 140

Pro Ala Ile Phe Ala Ser Gly Ile Ile Met Asp Ser Ser Ile Ser Lys
145 150 155 160

Gln Ala Leu Ser Glu Ile Glu Thr Arg His Ser Glu Ile Ile Lys Leu
165 170 175

Glu Asn Ser Ile Arg Glu Leu His Asp Met Phe Met Asp Met Ala Met
180 185 190

Leu Val Glu Ser Gln Gly Glu Met Ile Asp Arg Ile Glu Tyr Asn Val
195 200 205

Glu His Ala Val Asp Tyr Val Glu Arg Ala Val Ser Asp Thr Lys Lys
210 215 220

Ala Val Lys Tyr Gln Ser Lys Ala Arg Arg Lys Lys Ile Met Ile Ile
225 230 235 240

Ile Cys Cys Val Ile Leu Gly Ile Val Ile Ala Ser Thr Val Gly Gly
245 250 255

Ile Phe Ala

<210> 26

<211> 288

<212> PRT

<213> Homo sapiens

<400> 26

Met Lys Asp Arg Thr Gln Val Leu Arg Thr Arg Arg Asn Ser Asp Asp
1 5 10 15

Lys Glu Glu Val Val His Val Asp Arg Asp His Phe Met Asp Glu Phe
20 25 30

Phe Glu Gln Glu Glu Glu Ile Arg Gly Cys Ile Glu Lys Leu Ser Glu
35 40 45

Asp Val Glu Gln Val Lys Lys Gln His Ser Ala Ile Leu Ala Ala Pro
50 55 60

Asn Pro Asp Glu Arg Thr Lys Gln Glu Leu Glu Asp Leu Thr Ala Asp
65 70 75 80

Ile Lys Lys Thr Ala Asn Lys Val Arg Ser Lys Leu Lys Ala Ile Glu
85 90 95

Gln Ser Ile Glu Gln Glu Glu Gly Ser Thr Ala Pro Arg Pro Ile Leu
100 105 110

Arg Ile Arg Lys Thr Gln His Ser Thr Leu Ser Arg Lys Phe Val Glu
115 120 125

Val Met Thr Glu Tyr Asn Ala Thr Gln Ser Lys Tyr Arg Asp Arg Cys
130 135 140

Lys Asp Arg Ile Gln Arg Gln Leu Glu Ile Thr Gly Arg Thr Thr Thr
145 150 155 160

Asn Glu Glu Leu Glu Asp Met Leu Glu Ser Gly Lys Leu Pro Ile Phe
165 170 175

Thr Asp Asp Ile Lys Met Asp Ser Gln Met Thr Lys Gln Ala Leu Asn
180 185 190

Glu Ile Glu Thr Arg His Asn Glu Ile Ile Lys Leu Glu Thr Ser Ile
195 200 205

Arg Glu Leu His Asp Met Phe Val Asp Met Ala Met Leu Val Glu Ser
210 215 220

Gln Gly Glu Met Ile Asp Arg Ile Glu Tyr Asn Val Glu His Ser Val
225 230 235 240

Asp Tyr Val Glu Arg Ala Val Ser Asp Thr Lys Lys Ala Val Lys Tyr
245 250 255

Gln Ser Lys Ala Arg Arg Lys Lys Ile Ile Ile Ile Ile Cys Cys Val
260 265 270

Val Leu Gly Val Val Leu Ala Ser Ser Ile Gly Cys Thr Leu Gly Leu
275 280 285

<210> 27

<211> 291

<212> PRT

<213> Drosophila melanogaster

<400> 27

Met Thr Lys Asp Arg Leu Ala Ala Leu His Ala Ala Gln Ser Asp Asp
1 5 10 15

Glu Glu Glu Thr Glu Val Ala Val Asn Val Asp Gly His Asp Ser Tyr
20 25 30

Met Asp Asp Phe Phe Ala Gln Val Glu Glu Ile Arg Gly Met Ile Asp
35 40 45

Lys Val Gln Asp Asn Val Glu Glu Val Lys Lys Lys His Ser Ala Ile
50 55 60

Leu Ser Ala Pro Gln Thr Asp Glu Lys Thr Lys Gln Glu Leu Glu Asp
65 70 75 80

Leu Met Ala Asp Ile Lys Lys Asn Ala Asn Arg Val Arg Gly Lys Leu
85 90 95

Lys Gly Ile Glu Gln Asn Ile Glu Gln Glu Glu Gln Gln Asn Lys Ser
100 105 110

Ser Ala Asp Leu Arg Ile Arg Lys Thr Gln His Ser Thr Leu Ser Arg
115 120 125

Lys Phe Val Glu Val Met Thr Glu Tyr Asn Arg Thr Gln Thr Asp Tyr
130 135 140

Arg Glu Arg Cys Lys Gly Arg Ile Gln Arg Gln Leu Glu Ile Thr Gly
145 150 155 160

Arg Pro Thr Asn Asp Asp Glu Leu Glu Lys Met Leu Glu Glu Gly Asn
165 170 175

Ser Ser Val Phe Thr Gln Gly Ile Ile Met Glu Thr Gln Gln Ala Lys
180 185 190

Gln Thr Leu Ala Asp Ile Glu Ala Arg His Gln Asp Ile Met Lys Leu
195 200 205

Glu Thr Ser Ile Lys Glu Leu His Asp Met Phe Met Asp Met Ala Met
210 215 220

Leu Val Glu Ser Gln Gly Glu Met Ile Asp Arg Ile Glu Tyr His Val
225 230 235 240

Glu His Ala Met Asp Tyr Val Gln Thr Ala Thr Gln Asp Thr Lys Lys
245 250 255

Ala Leu Lys Tyr Gln Ser Lys Ala Arg Arg Lys Lys Ile Met Ile Leu
260 265 270

Ile Cys Leu Thr Val Leu Gly Ile Leu Ala Ala Ser Tyr Val Ser Ser
275 280 285

Tyr Phe Met
290

<210> 28

<211> 6

<212> PRT

<213> Nicotiana tabacum

<400> 28

Leu Gln Val Ala Arg Lys
1 5

<210> 29

<211> 6

<212> PRT

<213> Drosophila melanogaster

<400> 29

Thr Lys Lys Ala Leu Lys
1 5

<210> 30

<211> 6

<212> PRT

<213> Rattus sp.

<400> 30

Thr Lys Lys Ala Val Lys
1 5

<210> 31

<211> 6

<212> PRT

<213> yeast sp.

<400> 31

Thr Asp Lys Ala Val Lys
1 5

<210> 32

<211> 6

<212> PRT

<213> yeast sp.

<400> 32

Thr Asn Lys Ala Val Lys
1 5

<210> 33

<211> 13

<212> PRT

<213> Nicotiana tabacum

<400> 33

Asp Gln Ser Asp Ser His Ala Ile Glu Met Gly Asp Ile
1 5 10

<210> 34

<211> 5

<212> PRT

<213> Nicotiana tabacum

<400> 34

Gly Cys Gly Pro Gly
1 5

<210> 35

<211> 25

<212> PRT

<213> Nicotiana tabacum

<400> 35

Leu Glu Arg Asn Leu Lys Glu Leu His Gln Val Phe Leu Asp Met Ala
1 5 10 15

Val Leu Val Glu Ser Gln Gly Ala Gln
20 25

<210> 36

<211> 25

<212> PRT

<213> Arabidopsis thaliana

<400> 36

Ile Glu Lys Ser Leu Leu Glu Leu His Gln Val Phe Leu Asp Met Ala
1 5 10 15

Val Met Val Glu Ser Gln Gly Glu Gln
20 25

<210> 37

<211> 25

<212> PRT

<213> Homo sapiens

<400> 37

Leu Glu Asn Ser Ile Arg Glu Leu His Asp Met Phe Met Asp Met Ala
1 5 10 15

Met Leu Val Glu Ser Gln Gly Glu Met
20 25

<210> 38

<211> 20

<212> PRT

<213> Nicotiana tabacum

<400> 38

Ile Ile Leu Leu Leu Ile Ile Ile Leu Val Val Val Leu Ser Ile Gln
1 5 10 15

Pro Trp Lys Lys
20

<210> 39

<211> 22

<212> PRT

<213> Arabidopsis thaliana

<400> 39

Ile Ile Val Leu Leu Leu Ile Ile Leu Ile Val Val Ile Pro Ile Ile
1 5 10 15

Thr Ser Phe Ser Ser Ser
20

<210> 40

<211> 21

<212> PRT

<213> Homo sapiens

<400> 40

Ile Ile Ile Cys Cys Val Ile Leu Gly Ile Val Ile Ala Ser Thr Val
1 5 10 15

Gly Gly Ile Phe Ala
20

<210> 41

<211> 20

<212> DNA

<213> Artificial sequence

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<221> misc_feature

<222> (1)..(20)

<223> primer

<400> 41
taatacgact cactataggg 20

<210> 42

<211> 17

<212> DNA

<213> Artificial sequence

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<222> (1)..(17)

<223> primer

<400> 42
gtaaaacgac ggccagt 17

<210> 43

<211> 19

<212> DNA

<213> Artificial sequence

<220>

<221> misc_feature

<222> (1)..(19)

<223> primer

<400> 43
ggaaacagct atgaccatg 19

<210> 44

<211> 13

<212> PRT

<213> keyhole limpet haemocyanin

<400> 44

Cys Gly Pro Gly Ser Ser Ser Asp Arg Thr Arg Thr Ser
1 5 10

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Application No.: 09/ 509738

NOTICE TO COMPLY WITH REQUIREMENTS FOR PATENT APPLICATIONS CONTAINING NUCLEOTIDE SEQUENCE AND/OR AMINO ACID SEQUENCE DISCLOSURES

The nucleotide and/or amino acid sequence disclosure contained in this application does not comply with the requirements for such a disclosure as set forth in 37 C.F.R. 1.821 - 1.825 for the following reason(s):

- [X] 1. This application clearly fails to comply with the requirements of 37 C.F.R. 1.821-1.825. Applicant's attention is directed to these regulations, published at 1114 OG 29, May 15, 1990 and at 55 FR 18230, May 1, 1990.
- [ ] 2. This application does not contain, as a separate part of the disclosure on paper copy, a "Sequence Listing" as required by 37 C.F.R. 1.821(c).
- [ ] 3. A copy of the "Sequence Listing" in computer readable form has not been submitted as required by 37 C.F.R. 1.821(e).
- [ ] 4. A copy of the "Sequence Listing" in computer readable form has been submitted. However, the content of the computer readable form does not comply with the requirements of 37 C.F.R. 1.822 and/or 1.823, as indicated on the attached copy of the marked -up "Raw Sequence Listing."
- [ ] 5. The computer readable form that has been filed with this application has been found to be damaged and/or unreadable as indicated on the attached CRF Diskette Problem Report. A Substitute computer readable form must be submitted as required by 37 C.F.R. 1.825(d).
- [ ] 6. The paper copy of the "Sequence Listing" is not the same as the computer readable from of the "Sequence Listing" as required by 37 C.F.R. 1.821(e).
- [ ] 7. Other: the specification and the claims do not have sequence identification numbers at each sequence as required by 37 CFR 1,821(d).

Applicant Must Provide:

- [X] An initial or substitute computer readable form (CRF) copy of the "Sequence Listing".
- [X] An initial or substitute paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification.
- [X] A statement that the content of the paper and computer readable copies are the same and, where applicable, include no new matter, as required by 37 C.F.R. 1.821(e) or 1.821(f) or 1.821(g) or 1.825(b) or 1.825(d).

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For CRF Submission Help, call (703) 308-4212
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